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(54) **A METHOD FOR MANUFACTURING A FABRIC-LIKE LAMINATE AND A PRODUCT MANUFACTURED ACCORDING TO SAID METHOD**

VERFAHREN ZUR HERSTELLUNG VON EINEM GEWEBEÄHNLICHEN LAMINAT SOWIE DANACH HERGESTELLTES PRODUKT

PROCEDE DE FABRICATION D'UN STRATIFIE DE PAPIER MOUSSELINE CREPE ANALOGUE A DU TISSU

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## Description

The present invention relates to a method for manufacturing a fabric-like laminate preferably made of wet-strength-treated tissue paper and a product manufactured according to said method.

It is previously known to manufacture a fabric-like material of paper, in which a plastisol is used as a binder, and quality supplying additional material to laminate two or more layers of tissue paper, said material being suitable for manufacturing table-cloths, having the desired qualities as heaviness, drape, softness and tensile strength. An important reason in using a plastisol is the fact that it is not water-based, whereby those problems are avoided which otherwise are associated with a strong wetting of tissue paper webs.

There is now an interest for environmental reasons to develop alternative laminates manufactured by the aid of water-based binders also having the above-mentioned qualities, such as heaviness, drape, softness and tensile strength.

However, during the development work problems have arisen to manufacture well-functioning laminates, when water-based binders are used for laminating creped tissue paper and the manufacturing problems have been enormous. The wetting of the paper has led to softening, swelling and defects in the creping, which in turn has resulted in difficulties with inter alia the guidance of the webs. The finished laminate obtained has had disqualifying stiffness, which has not met the requirements determined what concerns drape and softness.

According to the present invention these drawbacks are eliminated making it possible to manufacture a product having - for the most part - corresponding quality properties as the product previously known but which in turn is much cheaper and simpler to manufacture and which moreover is better what concerns the environment. The characterizing features of the present invention are stated in the enclosed claims.

Since tissue paper used for manufacturing laminate for table-cloths is negatively affected by strong wetting, the development work has been directed in trying to eliminate the negative effects which can arise in coating of water-based adhesives.

One way to eliminate the problems is to avoid disturbing effect of the wetting even what concerns thin webs.

By the aid of the development work this condition has now been possible to achieve by certain essential measures according to the invention, which on one hand per se and on the other hand taken together give the desired result.

Partial coating in patterns of preferably lines is one possibility, which can be used in order to attain good functional binding between tissue paper layers without the partial wetting giving injurious influence, since the paper web for the most part remains uninfluenced by

the moisture.

Said pattern application occurs preferably in a square pattern created by spaced lines, said lines forming for example quadratic or hexagonal squares.

When the square-line pattern is placed having the "head lines" aligned diagonally over the web, the smallest possible negative wetting effect is obtained, since the creping only constitutes transverse creped folds.

The width of the lines and the size of the squares are adapted to the quality of the tissue paper, apparatus construction, type of adhesive and working conditions in relation to product requirements.

A pattern application as described above is especially suitable for laminating of two tissue paper webs in a first step, as the requirement of the laminate after drying is the fact that it shall be strong enough to be "stabilizer" in the following laminating to another tissue paper web. This finished laminate consists in other words of three layers of tissue paper.

In another embodiment the pattern is made by lines, which mainly extend along the web, especially as lines parallel to the web. After application the web passes through a dryer, which dries the web to such a state, that the dried adhesive constitutes a swelling-restraining and strength-increasing part of the web, when said web passes into the adhesive application station in the second step in order to be laminated to another tissue paper web. This laminate consists in other words of two layers of tissue paper.

The pattern embodiments can be varied to geometric form and dimension in many ways, but the basic requirement is the fact that such a big binding force and strengthening force, respectively, shall be able to be attained, that this first web has the qualities required for functioning in a following process step at the same time as observable disturbing effects of the laminate intended to be used as table-cloths are not allowed to occur.

The tissue paper used for the laminate for manufacturing of table-cloths is highly creped in order to render big softness. In order to attain the softness wanted in the laminate is now proposed an embodiment having a water-based adhesive compound containing a dispersion adhesive, a large amount of filler and "water-retaining" and viscosity regulating additives suited for a manufacturing equipment working under such conditions that the adhesive only reaches to a limited depth in the surface layer of the tissue paper.

By this limited penetration in the surface layer it is possible in a not complicated embodiment only to dry the tissue paper web in the first step, but at that moment to such a low moisture that only the limited adhesive penetration in the second step does not wet this not strengthened web more than it being able to be "stabilizer" in the second step. The finished laminate consists in other words of two layers of tissue paper.

The adhesive compound used in the second step contains a large amount of filler in order to give the fin-

ished table-cloth so-called drape, i.e. that the table-cloth softly extends over edges and corners in a way which imitates fabric materials.

The filler can be inorganic, such as dolomite, chalk, talc, barium sulphate, titanium dioxide, kaolin or organic, such as wood meal.

The adhesive compound used in the second step can be made of such a type of adhesive and be applied in such an amount that a relatively good water-penetrating barrier is obtained. If, however, a totally water and moisture safe table-cloth material should be required, you must use a leak-proof plastic film laminated between the tissue paper webs. Such a film can be inserted either between the two webs in the first step in order to form a three-layer paper laminate or between the two webs in the second step in order to form a two-layer paper laminate.

The invention will now be described in further detail below with reference to the enclosed drawing, which schematically shows a section of an apparatus for manufacturing a product according to the present invention.

The drawing illustrates a preferred embodiment of an apparatus 1 according to the present invention consisting of four reel stands 2, 3, 4 and 13, three adhesive applicators 5, 6 and 15, and two dryers 7 and 8.

The method according to a preferred embodiment of the present invention for manufacturing laminates of tissue-paper having a large amount of filler for converting into e.g. table-cloths is made by unwinding a first and a second tissue paper web 9 and 10, respectively, from the reel stands 2 and 3, respectively, and laminating these together into a web A in a first step containing a first nip 11, for example a roller nip, whereafter the laminated web A is dried to a total web strength by the dryer 7. Hereafter the web A is laminated in a second step in a second nip 12, for example a roller nip, together with a further tissue paper web B coming from the reel stand 4 by means of a water based adhesive compound, which after drying by the dryer 8 gives a finished product, which has the required qualities for e.g. table-cloths, such as drape, softness, tensile strength, tear strength, heaviness and opacity.

The application of adhesive can be made by for example roller application or spraying.

The two tissue paper webs 9 and 10 are preferably wet-strength-treated so that the two-layer laminate manufactured in the first step will function well in the second laminating step and take part in a good final product.

In special cases a thin plastic film 14 is added in order to guarantee a total liquid-tightness of the laminate. The plastic film 14 is applied to the adhesive in the applicator station 15, said adhesive thereafter being adhered against the web 10 in a laminate consisting of three layers of tissue paper. When manufacturing a laminate consisting of two layers of tissue paper the adhesive is applied to the plastic film 14 in the applicator station 6.

The adhesive compound applied in the second step by the aid of the applicator 6 and in the second nip 12 consists of a dispersion adhesive mixed with a filler, which admits penetration into the surface layers of the tissue paper webs directed towards each other, said penetration being made to a manufacturing-related, determined depth at the same time as it renders the material in question a big binder strength. After drying of the laminate a final product is obtained, which has the required qualities for e.g. table-cloths, such as drape, heaviness, tensile strength and softness. The filler used in the water-based adhesive compound can be dolomite, chalk, talc, barium sulphate, titanium, dioxide, kaolin or any other suitable substance and the amount of filler can vary between 10 and 120%, counted on the dry latex which is contained in the adhesive compound.

An advantage with for example dolomite is the fact that it is basic, so that it neutralizes the acid adhesive and can take part in the neutralization of other acid substances as well, for example during burning.

The application of the water-based adhesive on the web 9 in the first step takes preferably place by pattern application, for example in a square-pattern, having lines, which extend obliquely across the web, so that an adhesive distribution over the web surface is achieved, which after laminating in the nip 11 and drying in the dryer 7 render a good binding between the webs and a full web strength without this laminate A having the defects obtained from earlier manufacturing tests.

The other dryer 8 used during the second step is preferably in the form of a cylinder, said cylinder giving a good smoothing-out effect on the laminate.

Due to the fact that the web A consists of two laminated tissue paper layers, the laminating into the web B in the second step will be made using the water-based adhesive compound in a satisfactorily good way due to the fact that said adhesive compound has a limited penetrating depth in the web surface layers directed against each other, said penetrating depth being manufacturing-related.

The outer layer in the web A, i.e. the tissue paper web 9 and part of the web 10, retains its qualities during the laminating process in the second step, owing to the fact that the adhesive compound here has a limited penetrating depth. The amount of filler can in this step reach at least 10%, counted on dry latex, which exists in the adhesive compound. Tests have also been made using such a large amount of filler as 100-120%, counted on dry latex which exists in the adhesive compound with a very good result.

With the expression "manufacturing-related" is in this connection meant that a plurality of parameters have importance what concerns the depth of penetration of the adhesive compound in the tissue paper webs against surface layers directed towards each other in the second step. A parameter is the velocity of the web, which in the preferred embodiment is about 120 m/min. Another parameter is the viscosity of the adhesive com-

pound, which is for example temperature-depending - in the example about 20°C - and which in this case is in the range of order of 1800 cPs. A third parameter is the moisture in the webs, which can be 6-8%.

Further parameters which have importance for the penetration of the adhesive compound into the surface layers are the wetting qualities of the adhesive web in relation to the qualities of the tissue paper webs in just the surface layer and the layers below this, the temperature of the webs and of the dryer 8 and the surrounding angle for the web around the drying cylinder. Also the nip pressure between the rollers in the nip 12 is of importance.

The method according to another preferred embodiment of the present invention includes pattern application on the web 9, which after drying in the dryer 7 has been provided with a reinforcement by the aid of the dried adhesive in such a way that the dried web A can function well in the following second laminating step.

Thus the product manufactured according to the method for manufacturing of for example table-cloths comprises at least two preferably wet-strength-treated laminated tissue paper webs, the laminated surface layer of said webs directed against each other having an adhesive compound penetrated to a limited depth in the respective surface layer having a filler of the type mentioned above in providing a desired heaviness, drape, softness and tensile strength of the laminate.

#### Claims

1. A method for manufacturing a fabric-like laminate of creped tissue paper, which preferably is wet-strength-treated and which has the required qualities for e.g. table-cloths, such as drape, heaviness, softness and tensile strength, characterized in that in a first step an adhesive is applied to a first tissue paper web (9) in patterns to form a first web (A), said web in a second step being laminated to another tissue paper web (B) by means of a water-based adhesive compound containing a dispersion adhesive mixed with a large amount of filler, said compound making that the adhesive only penetrates a limited depth into the surface layer of the webs (A, B) directed towards each other at the same time as it gives the material in question a big binding strength.
2. A method according to Claim 1, characterized in that a water-based adhesive is applied to the tissue paper web (9) in the first step preferably by roller coating in the form of a spaced pattern to receive a partial extension of the adhesive over the tissue paper web having a strongly reduced negative wetting effect.
3. A method according to Claims 1 or 2, characterized in that the pattern application in the first step is

made in the form of a square-line pattern having preferably squared or hexagonal square-lines, which extend transversely over the first tissue paper web (9) in providing of smallest possible negative effect on the creped, moisture-sensitive tissue paper web (9).

4. A method according to Claims 1 or 2, characterized in that the pattern application is made in the form of longitudinal lines in providing the largest possible tensile strength in the longitudinal direction of the tissue paper web (9) after drying.
5. A method according to Claims, 1, 2 or 3, characterized in that a second tissue paper web (10) is laminated in the first step together with the first tissue paper web (9) on which the adhesive is applied in patterns, for forming the web (A), which after drying up to a total web strength passes into the second step.
6. A method according to Claims 1 or 5, characterized in that a thin plastic film (14) is inserted in the first step between the two tissue paper webs (9, 10) and is laminated to those.
7. A fabric-like laminate of creped tissue paper, which preferably is wet-strength-treated and which has the required qualities for e.g. table-cloths, such as drape, heaviness, softness and tensile strength, characterized in that it comprises at least two tissue paper webs (A, B) laminated together, the surface layers of said webs laminated and directed towards each other containing a water-based adhesive compound with a large amount of filler penetrated a limited depth into respective said surface layer.
8. A laminate according to Claim 7, characterized in that the water-based adhesive has a filler in an amount which is variable between 10 and 120%, counted on dry latex in the adhesive compound, said filler consisting of for example dolomite, chalk, talc, barium sulphate, titanium dioxide, kaolin or wood meal.
9. A laminate according to Claim 7, characterized in that a plastic film (14) is laminated between the tissue paper webs (9, 10; A, B).

#### Patentansprüche

1. Verfahren zur Herstellung eines gewebeähnlichen Laminats aus gekrepptem Seidenpapier, das vorzugsweise für eine Naßfestigkeit behandelt ist und die erforderlichen Eigenschaften bspw. für Tischtücher aufweist, wie bspw. Warenfall, Schwere, Weichheit und Zugfestigkeit, dadurch gekenn-

- zeichnet, daß in einer ersten Stufe ein Klebe- bzw. Haftmittel auf eine erste Seidenpapier-Warenbahn (9) in Mustern aufgebracht wird, um eine erste Warenbahn (A) zu bilden, wobei diese Warenbahn in einer zweiten Stufe mit einer anderen Seidenpapier-Warenbahn (B) mittels einer Klebemittelverbindung auf der Basis von Wasser laminiert wird, die ein Dispersionsklebemittel enthält, welches mit einer großen Menge eines Füllmittels gemischt ist, wobei die Verbindung eine Vorkehrung dafür schafft, daß das Klebemittel nur über eine begrenzte Tiefe in die Oberflächenschicht der Warenbahnen (A, B) eindringt, die gegeneinander ausgerichtet sind, während sie gleichzeitig dem fraglichen Material eine große Bindefestigkeit verleiht.
2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß das Klebe- bzw. Haftmittel auf der Basis von Wasser auf die Seidenpapier-Warenbahn (9) in der ersten Stufe vorzugsweise durch eine Rollenbeschichtung in der Ausbildung eines beabstandeten Musters aufgebracht wird, um eine teilweise Verlängerung des Klebemittels über der Seidenpapier-Warenbahn mit einer stark reduzierten negativen Benässungswirkung zu empfangen.
3. Verfahren nach den Ansprüchen 1 oder 2, dadurch gekennzeichnet, daß die Anbringung des Musters in der ersten Stufe in der Form eines quadratischen Linienmusters mit vorzugsweise quadratischen oder hexagonalen Quadratlinien ausgeführt wird, die quer über die erste Seidenpapier-Warenbahn (9) verlaufen, um die kleinstmögliche negative Wirkung auf die gekreppte, gegenüber Feuchtigkeit empfindliche Seidenpapier-Warenbahn (9) zu schaffen.
4. Verfahren nach den Ansprüchen 1 oder 2, dadurch gekennzeichnet, daß die Anbringung des Musters in der Form von längs verlaufenden Linien durchgeführt wird, um die größtmögliche Zugfestigkeit in der Längsrichtung der Seidenpapier-Warenbahn (9) nach dem Trocknen zu schaffen.
5. Verfahren nach den Ansprüchen 1, 2 oder 3, dadurch gekennzeichnet, daß die zweite Seidenpapier-Warenbahn (10) in der ersten Stufe zusammen mit der ersten Seidenpapier-Warenbahn (9) laminiert wird, auf welche das Klebemittel in Mustern aufgebracht wird, um die Warenbahn (A) zu bilden, die nach dem Trocknen zu einer Festigkeit der gesamten Warenbahn in die zweite Stufe übergeht.
6. Verfahren nach den Ansprüchen 1 oder 5, dadurch gekennzeichnet, daß eine dünne Kunststoffolie (14) in der ersten Stufe zwischen den beiden Seidenpapier-Warenbahnen (9, 10) eingefügt und mit diesen laminiert wird.
7. Gewebeähnliches Laminat aus einem gekreppten Seidenpapier, das vorzugsweise für eine Naßfestigkeit behandelt ist und die erforderlichen Eigenschaften bspw. für Tischtücher aufweist, wie bspw. Warenfall, Schwere, Weichheit und Zugfestigkeit, dadurch gekennzeichnet, daß es wenigstens zwei Seidenpapier-Warenbahnen (A, B) aufweist, die miteinander laminiert sind, wobei die Oberflächenschichten der laminierten und gegeneinander ausgerichteten Warenbahnen eine Klebe- bzw. Haftmittelverbindung auf der Basis von Wasser mit einer großen Menge eines Füllmittels enthält, die über eine begrenzte Tiefe in die betreffende Oberflächenschicht eingedrungen ist.
8. Laminat nach Anspruch 7, dadurch gekennzeichnet, daß das Klebe- bzw. Haftmittel auf der Basis von Wasser ein Füllmittel in einer Menge aufweist, die zwischen 10 und 120 % variiert, berechnet nach dem trockenen Latex in der Klebemittelverbindung, wobei das Füllmittel bspw. aus Dolomit, Kreide, Talk, Bariumsulfat, Titandioxid, Kaolin oder Holzmehl besteht.
9. Laminat nach Anspruch 7, dadurch gekennzeichnet, daß eine Kunststoffolie (14) zwischen den Seidenpapier-Warenbahnen (9, 10; A, B) laminiert ist.

#### Revendications

1. Un procédé de fabrication d'un stratifié de papier mousseline crêpé analogue à du tissu, qui est de préférence traité quant à sa résistance à l'humidité et qui présente les qualités requises par exemple pour des nappes de table, telles que drapé, lourdeur, douceur et résistance à la traction, caractérisé en ce que, dans une première phase, un adhésif est appliqué à un premier voile (9) de papier mousseline suivant des configurations pour former un premier voile (A), ledit voile étant, dans une seconde phase, stratifié à un autre voile de papier mousseline (B) au moyen d'un composé adhésif à base d'eau contenant un adhésif en dispersion mélangé avec une grande quantité de matière de remplissage, ledit composé faisant que l'adhésif ne pénètre que suivant une profondeur limitée à l'intérieur de la couche de surface des voiles (A, B) dirigés l'un vers l'autre, en même temps qu'il donne à la matière en question une force de liaison élevée.
2. Un procédé selon la revendication 1, caractérisé en ce qu'un adhésif à base d'eau est appliqué au voile (9) de papier mousseline dans la première phase de préférence par revêtement au rouleau

sous la forme d'une configuration espacée pour recevoir un étalement partiel de l'adhésif sur le voile de papier mousseline présentant un effet au mouillage négatif fortement réduit.

3. Un procédé selon les revendications 1 ou 2, caractérisé en ce que l'application en configuration dans la première phase est effectuée sous la forme d'une configuration en quadrillage ayant de préférence un quadrillage carré ou hexagonal, qui s'étend transversalement sur le premier voile de papier mousseline (9) en donnant l'effet négatif le plus faible possible sur le voile de papier mousseline (9) crêpé et sensible à l'humidité. 5 10
4. Un procédé selon les revendications 1 ou 2, caractérisé en ce que l'application en configuration est réalisée sous la forme de lignes longitudinales en donnant la résistance à la traction la plus grande possible dans la direction longitudinale du voile de papier mousseline (9) après séchage. 15 20
5. Un procédé selon les revendications 1, 2 ou 3, caractérisé en ce qu'un second voile de papier mousseline (10) est stratifié dans la première phase, conjointement avec le premier voile de papier mousseline (9) sur lequel l'adhésif est appliqué suivant une configuration, pour former le voile (A) qui, après séchage jusqu'à une résistance totale du voile, passe à la seconde phase. 25 30
6. Un procédé selon les revendications 1 ou 5, caractérisé en ce qu'une fine pellicule de matière plastique (14) est introduite dans la première phase entre les deux voiles de papier mousseline (9, 10) et est stratifiée à ceux-ci. 35
7. Un stratifié de papier mousseline crêpé analogue à du tissu, qui est de préférence traité quant à sa résistance à l'humidité et qui présente les qualités requises par exemple pour des nappes de table, telles que drapé, lourdeur, douceur et résistance à la traction, caractérisé en ce qu'il comporte au moins deux voiles de papier mousseline (A, B) stratifiés l'un à l'autre, les couches de surface desdites voiles stratifiés et dirigés l'un vers l'autre contenant un composé adhésif à base d'eau avec une grande quantité de matière de remplissage ayant pénétré sur une profondeur limitée dans ladite couche de surface respective. 40 45 50
8. Un stratifié selon la revendication 7, caractérisé en ce que l'adhésif à base d'eau comporte une matière de remplissage suivant une quantité qui est variable entre 10 et 120 %, le calcul étant fait sur le latex sec dans le composé adhésif, ladite matière de remplissage consistant par exemple en dolomite, en craie, en talc, en sulfate de baryum, en dioxyde 55

de titane, en kaolin ou en farine de bois.

9. Un stratifié selon la revendication 7, caractérisé en ce qu'une pellicule (14) en matière plastique est stratifiée entre les voiles de papier mousseline (9, 10 ; A, B).

